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VISUAL IMPACT ASSESSMENT

Proposed development of a farm irrigation dam, Dartford Farm, Underberg, KwaZulu Natal.

Visual Impact Assessment for the proposed development of a farm irrigation dam, at Dartford Farm, Underberg, KwaZulu Natal

Report produced for

GREEN CHOICE CONSULTING

Report produced by

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Specialist declaration

The author of this report is independent, having no vested interest (either business, financial, personal or other), in the undertaking of the proposed activity, other than remuneration for professional fees in respect of work performed in terms of the Environmental Impact Assessment Regulations, 2014.

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1.0 Introduction

The Dartford Farming Trust owns and operates a large dairy and associated dairy livestock near Underberg in KwaZulu-Natal, South Africa. They have lodged an application for environmental authorisation for the construction of a new dam that will be used to supply irrigation water for pasture and other agricultural activities. GeoNest (Pty) Ltd. has been commissioned by Kevin Fraser of the Dartford Farming Trust to undertake a visual impact assessment as part of the Scoping & Environmental Impact Reporting process being conducted by Green Choice Consulting (www.greenchoiceconsulting.co.za) to inform the environmental authorisation application.

1.1 Background to VIA

A VIA is a technical evaluation of the potential impacts of a development on the visual amenity value of a landscape or place. It has the potential to be subjective given that an appreciation of landscape views, sense of place and cultural and personal associations with landscapes and their features are all aspects that people will often view differently. For this reason, this Visual Impact Assessment aims to focus on a number of key metrics which aim to be as objective as possible. The approach is also therefore guided by local and international best-practice resources:

1. *Guideline for involving visual and aesthetic specialists in EIA processes*[1]
2. *Landscape Character Assessment Guidance for England and Scotland*[2]

A landscape is made of a wide variety of components comprising aspects associated essentially with the relationship between people and place (Swanwick, 2002). These components are all interlinked and combine to form a person's perception of a landscape (Figure 1).

Whilst all of these components could be considered in assessing impacts on the aesthetic value of a landscape, it is not possible to evaluate all of them within the scope of a project such as this one, particularly an individual's perceptual components such as memories, preferences and associations. This assessment is therefore focused on the natural, cultural/social and aesthetic components of the landscape.

1.2 Scope of work

The scope of work for the visual impact assessment is as follows:

1. Collection and review of existing project related information including:
    a. Project description information,
    b. Project plans and spatial information (including spatial data of the site and surroundings).
    c. The development plans and policies of Local and District Municipalities.
    d. Site contextual information including topography (best publicly available if not provided by the project), land use etc.
2. Develop a viewshed model of the development site using the best available topographical data. If no better is provided by the project, the 30m JAXA Digital Elevation Model will be

[1] Oberholzer, B. 2005. Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

[2] Swanwick, C. 2002. Landscape Character Assessment, guidance for England and Scotland. Prepared on behalf of The Countryside Agency and Scottish Natural Heritage.

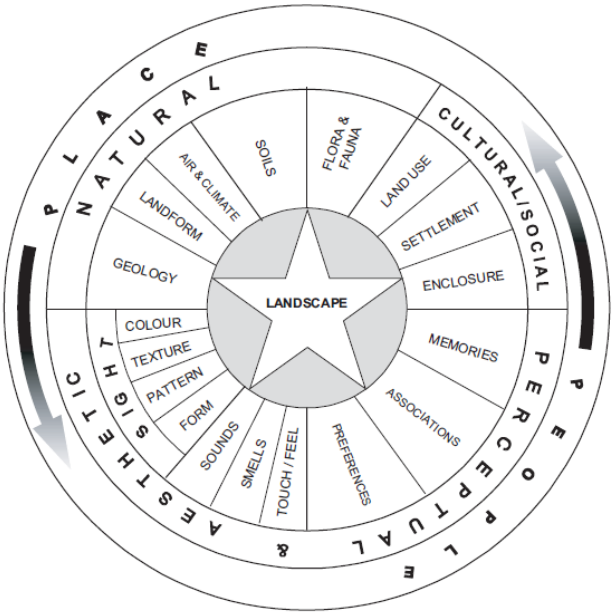


Figure 1: What is landscape - Taken from Swanwick 2002.

used and data supplied by the client regarding the dimensions and design specifications of all planned features. The locations of any receptors identified through the broader project's stakeholder engagement process will also be gathered where available.

3. Identify the view catchment area and potentially sensitive viewpoints and landscapes associated with the development based on the viewshed model. If necessary, this will include the delineation of Landscape Character Units as per Swanwick (2002).
4. Undertake a site visit to the project site to:
   a. Verify the outputs of the viewshed model and the locations of sensitive views / receptors
   b. Characterise and photograph the project landscape character units affected by the development
   c. Identify any additional elements of particular aesthetic value and quality
   d. Assess in the field, the character and sensitivity of the visual receptors, viewpoints and landscapes identified.
   e. Photograph sensitive views and sensitive landscapes.
5. Evaluation of outputs of the process to determine the significance of visual impacts based on guidelines provided by Oberholzer (2005). This will include assessments of direct, indirect and cumulative impacts and will address:
   a. Visual exposure of the development site
   b. Visual absorption capacity of the area
   c. Landscape integrity
   d. Viewing distance and visibility of the project
   e. Sensitivity of Viewers (visual receptors) and distribution of impacts.
6. Outputs and findings information will be compiled into a single Visual Impact Assessment Report. This will address all requirements of the environmental impact assessment regulations, 2014 and will include:
   a. A description of the receiving environment, existing impacts, character of the different landscape character units and elements of particular visual value and quality that may be affected by the development;
   b. A detailed methods section documenting methods, data, assumptions, and limitations.
   c. an assessment of impacts (direct, indirect, and cumulative) on the visual environment and sense of place based on professional opinion and the prescribed impact rating methodology.

d. A reasoned opinion
e. Mitigation measures to avoid or minimise the impacts of the development will be provided.
f. Any relevant environmental management and monitoring measures for inclusion in the Environmental Management Programme and in the authorisation.

1.3 Assumptions and Limitations

The following assumptions and limitations apply:

1. The layout, drawings, height regulations etc. for the layout and site are provided by the proponent and are assumed to represent the proposed development's specifications accurately.
2. The viewshed models produced in this report are generated using the best available topographic information to identify the areas from which the proposed development would be visible. The topographic information used is a close approximation of the earth's surface but is not a perfect representation and as such may not include minor topographic variations.
3. This document is a visual impact assessment and therefore confines itself to assessing visual impact issues. Other impacts such as noise cannot be adequately assessed in this scope of work and although they may impact the area's sense of place, are not included in this assessment.

2.0 Project Details

2.1 Project description

The application covers the construction of an earth dam wall for the purposes of harvesting water for irrigation of dairy pasture and other agricultural activities. The wall itself will be 10.5 meters high, 220 m in length and the dam will inundate 37.5 Ha of land. The exposed portions of the embankment will be vegetated by approved grasses. A spillway will be constructed at the southern end of the dam wall and will be vegetated with kikuyu grass. An extract from the technical drawings for this structure is given in Figure 2.

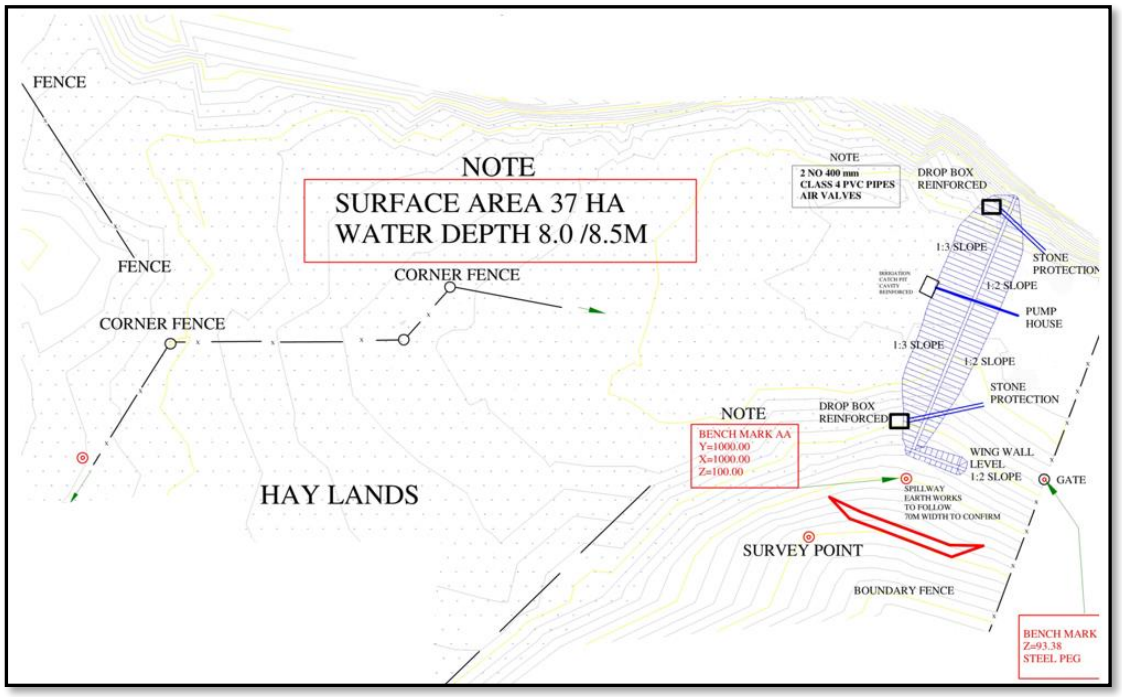


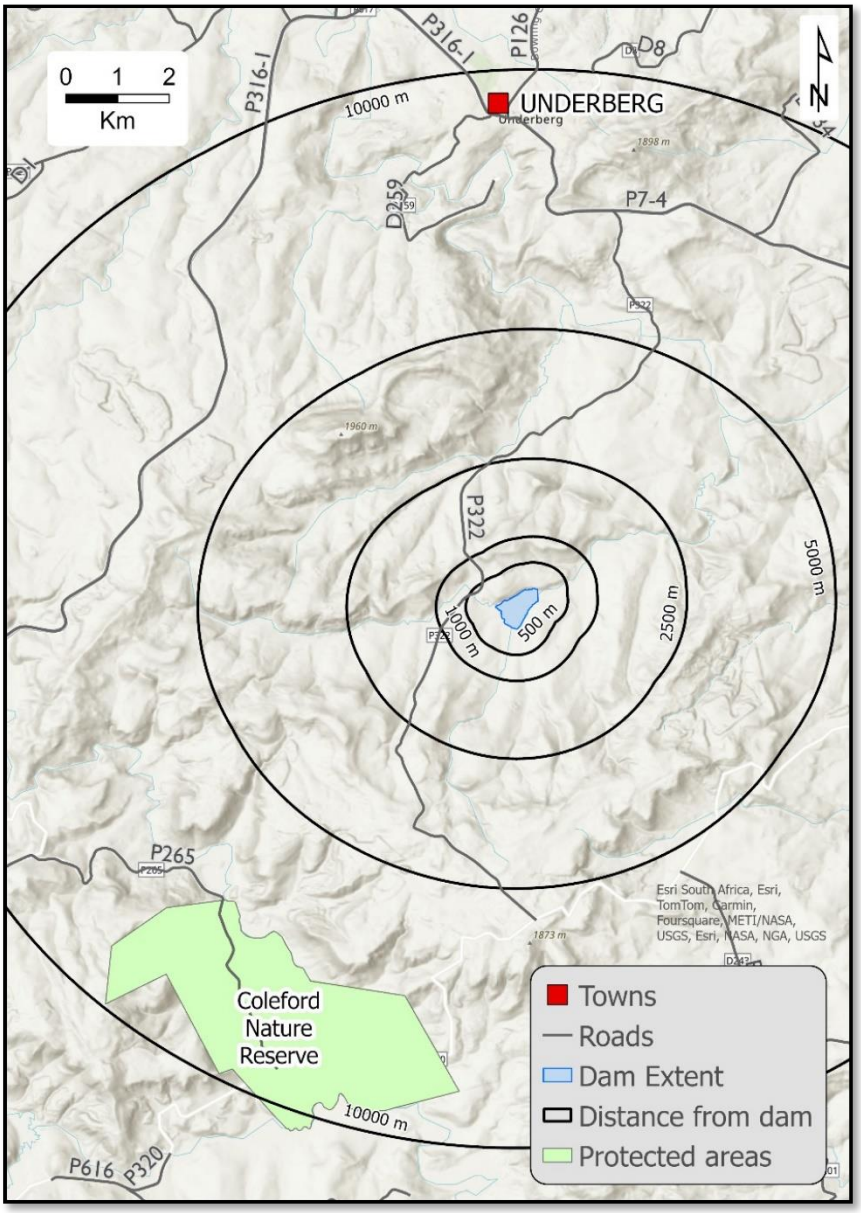
Figure 2: Feasibility study technical drawings for the proposed earth dam wall at Fraser Farm.

2.2 Location

The proposed Dam is located at coordinates 29.876988° S, 29.499985° E in the Dr Nkosazana Dlamini-Zuma local municipality (DNDZLM), and in the Harry Gwala District Municipality in KwaZulu-Natal.

More precisely, the dam is located on Farm LOT FP 173, Erf No 8581 which are found midway between Underberg and Coleford Nature Reserve on the P322 gravel road.

The dam wall is proposed to be built on the eKhamanzi Stream, a tributary of the uMzimkulu River, 1.5 km (run of river) downstream of the P322 crossing. From a hydrology perspective, the stream is part of the T51C quaternary catchment.



3.0 Environmental context

3.1 Site landscape topography

The site is located in the Drakensberg foothills and as such the topography of the surrounding landscape is characterised by relatively high hills, steep slopes and dolerite rock faces and relatively deeply incised valleys. From a visual impact perspective, this hilly topography results in high levels of visual enclosure and relatively close visual horizons. Figure 3 shows the location of the dam site in the topographical context of the area and shows the extent of enclosure the site benefits from.

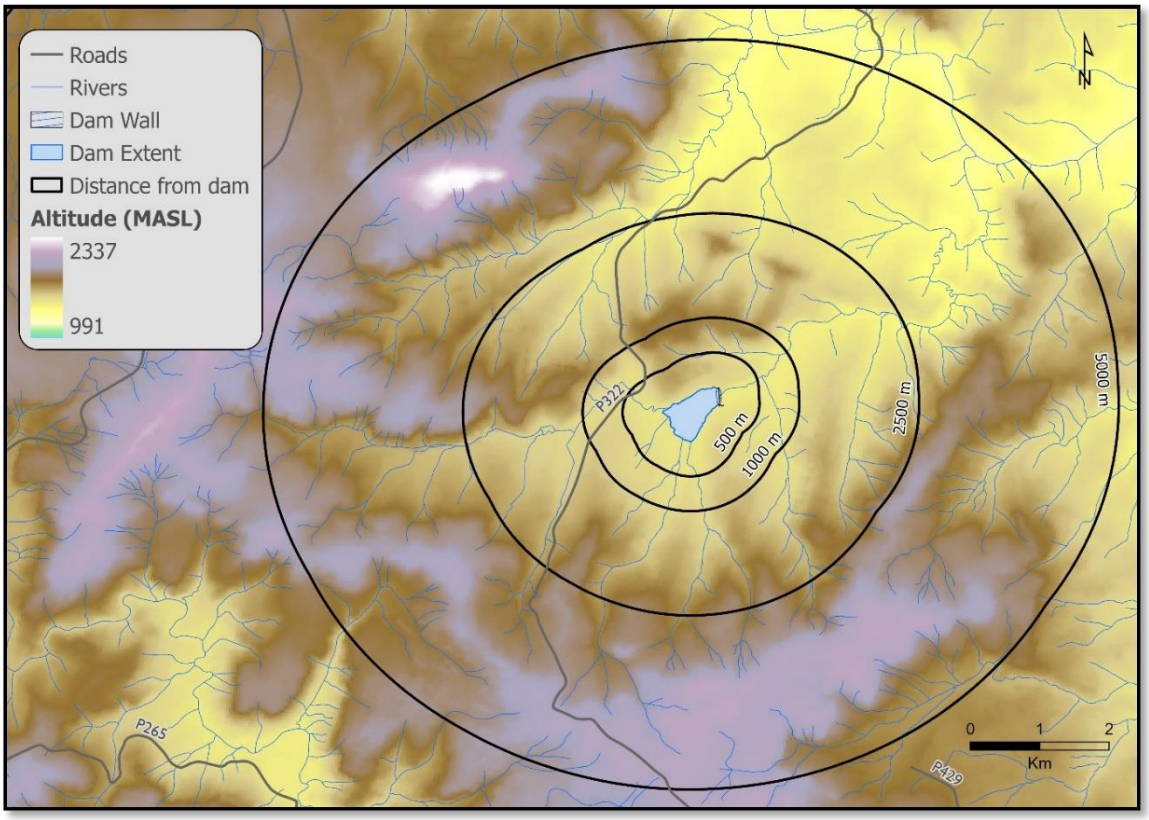


Figure 3: Topographical representation of the area around the proposed dam site.

3.2 Land cover, vegetation and land use

The site of the dam and its inundation area (Plate 1) is predominantly covered in grassland and other riparian vegetation including willow trees. The dam will inundate a small area of cropland as well.

Plate 1: The landcover and vegetation of the proposed site of the dam looking in a westerly direction across the dam.

3.3 Protected areas and areas of high scenic value

The dam is located in a municipality renowned for the scenic grandeur of the Drakensberg and its foothills. This area is considered of high ecological and tourism value and a number of protected areas have been proclaimed in the area to preserve this value. The most widely known is the Maloti-Drakensberg Park World Heritage Site. This internationally important area has been the basis for a landscape characterisation study of all adjacent local municipalities (including the NDZLM) which aimed to protect the visual character of the area (see section 4.0). This WHS is however approximately 18km away (straight line distance) (Figure 4) and is very unlikely to be impacted by the construction of the dam.

The closest protected area to which landscape focused tourists are likely to be drawn is Coleford Nature Reserve which is approximately 7.5km from the proposed dam site (Figure 4). The P322 is one of three roads used to access this reserve and tourists within the reserve and those traveling to the reserve may potentially be impacted by the dam development.

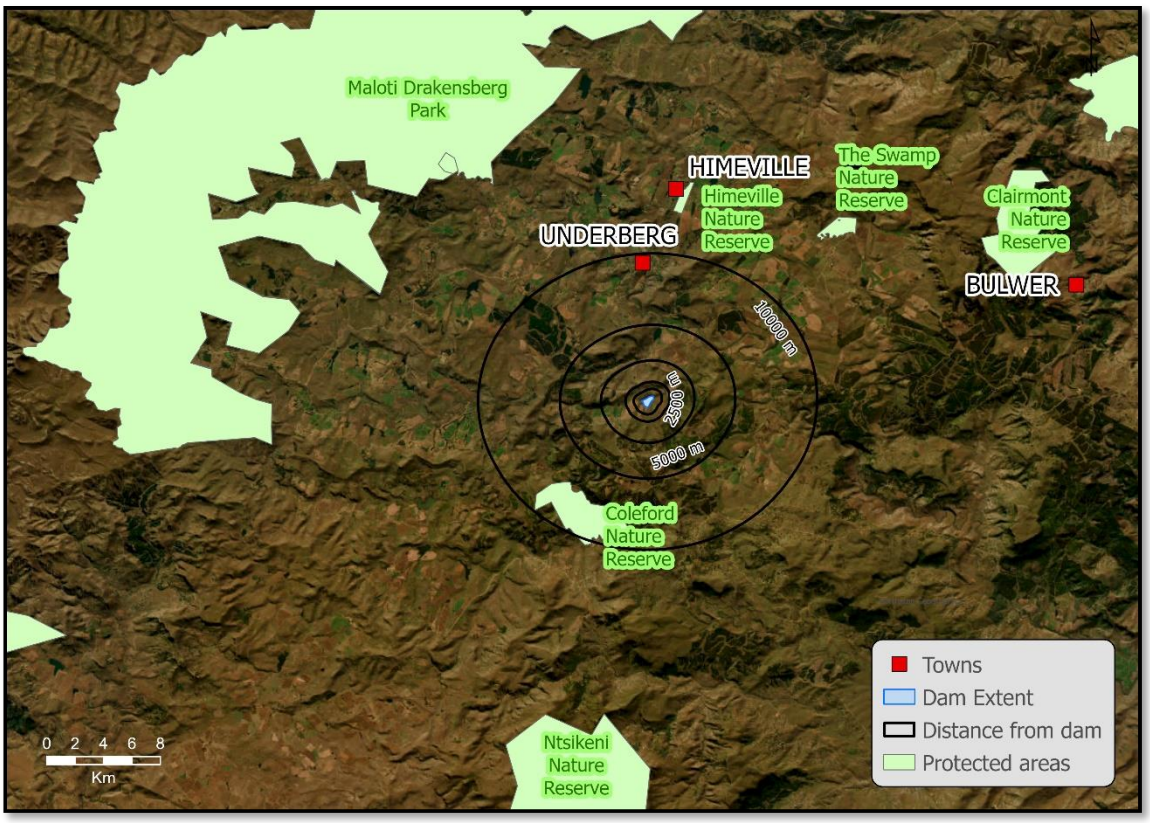


Figure 4: Protected areas in the vicinity of the proposed dam site.

4.0 Planning policy context

4.1 Planning policy context review

A review of spatially relevant planning policy has been conducted to derive a broad sense of the value placed on the area and the government's planning vision for its long-term development and form.

4.1.1 Dr Nkosasana Dlamini-Zuma LM Integrated Development Plan

In its mission statement, the DNDZLM states that "*Dr Nkosazana Dlamini Zuma Local Municipality will provide quality sustainable basic services,* ***promote tourism, agriculture****, good governance, community involvement,* ***economic investment*** *and* ***protect the environment*** *in its affairs*". This

clearly provides a foundation that looks to enhance agricultural investment whilst ensuring the environment its aesthetical value that drives tourism in the area are protected.

The DNDZLM IDP identifies several Municipal Development Goals (MDGs) and associated strategies which speak to the governmental vision for the municipality. The goals and strategies that are of relevance to this project are summarised in Table 1. Tourism is considered central to both eradicating poverty and to ensuring sustainable environmental management. Sustainable management of the environment is also fundamental to ecotourism. Note that irrelevant strategies have been omitted in the table.

Table 1: Relevant DNDZLM municipal development goals and associated strategies.

Number	MDG	Strategy
Goal 1.	Eradicate extreme poverty and hunger	☞ ……. ☞ To contribute towards the development of the Tourism Sector;
Goal 7.	Ensure environmental sustainability	☞ ….. ☞ Maintain our status as a World Heritage Site through adoption of relevant policies; ☞ To promote the sustainability and protection of the municipality's natural resources;

The IDP does not mention the development of irrigation infrastructure specifically but speaks to the challenges facing the LM in terms of economic development, attracting investment and the need for generating jobs in the municipality. Elsewhere in the IDP, the document summarises the DNDZLM Spatial Development Framework (SDF). This provides insight into the spatial vision for the development of the DNDZLM. The composite map of the SDF is shown in Figure 5.

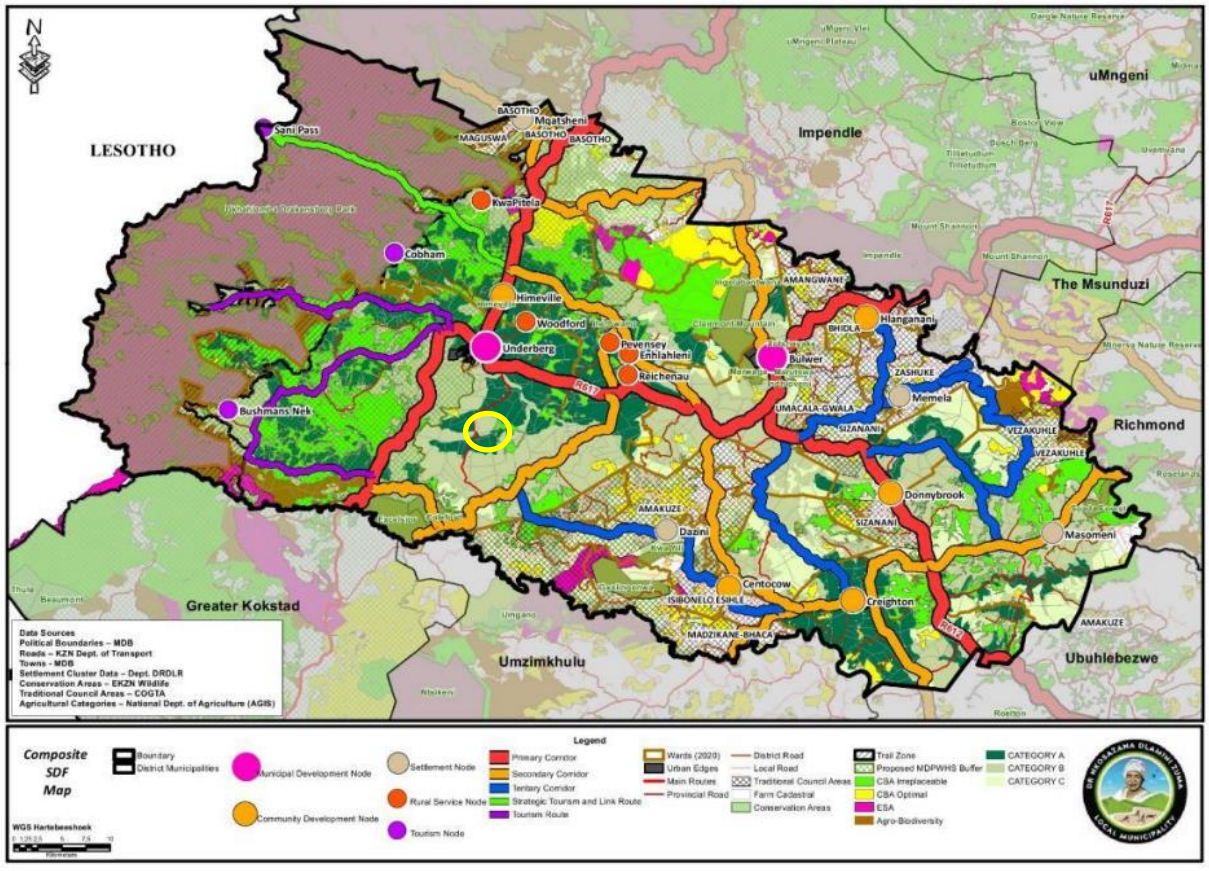


Figure 5: The composite DNDZLM spatial development framework map showing the location of the dam site in yellow circle

As part of the delineation of the MDPWHS Buffer Zone, and in support of protecting the Outstanding universal value (OUV) of the WHS, a landscape characterisation exercise was undertaken in all local municipalities adjoining the MDPWHS. This included the KwaSani Local Municipality as it was then known (Escott and Kiepiel 2009). This work was based on the method of Swanwick (2002) and involved fragmenting the municipal area into landscape character types (LCTs) in which landscapes of similar character were delineated based on broad characteristics such as geology, landform and land use (Figure 6).

These LCTs were then further fragmented into landscape character areas (LCAs) which captured localised similarities in character, sense of place, viewsheds and value. These LCAs were then evaluated in terms of their ability to absorb development of different levels, and a spatial product was generated reflecting this as each unit's development capacity. This product has been incorporated into the IDP (Figure 7). The proposed dam is located in the "Uplands" LCT.

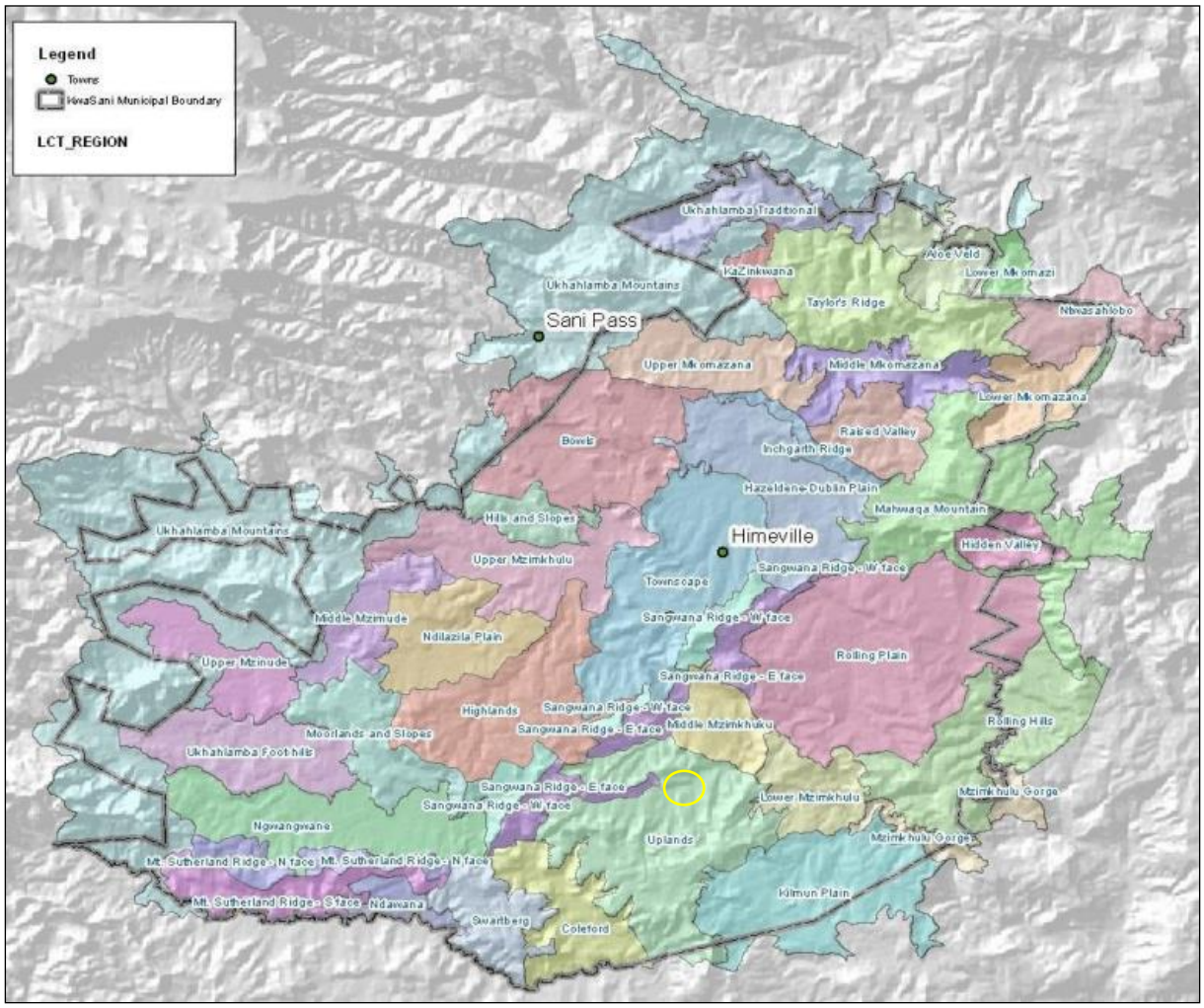


Figure 6: Landscape character types delineated for the erstwhile KwaSani LM (Escott and Kiepiel 2009).

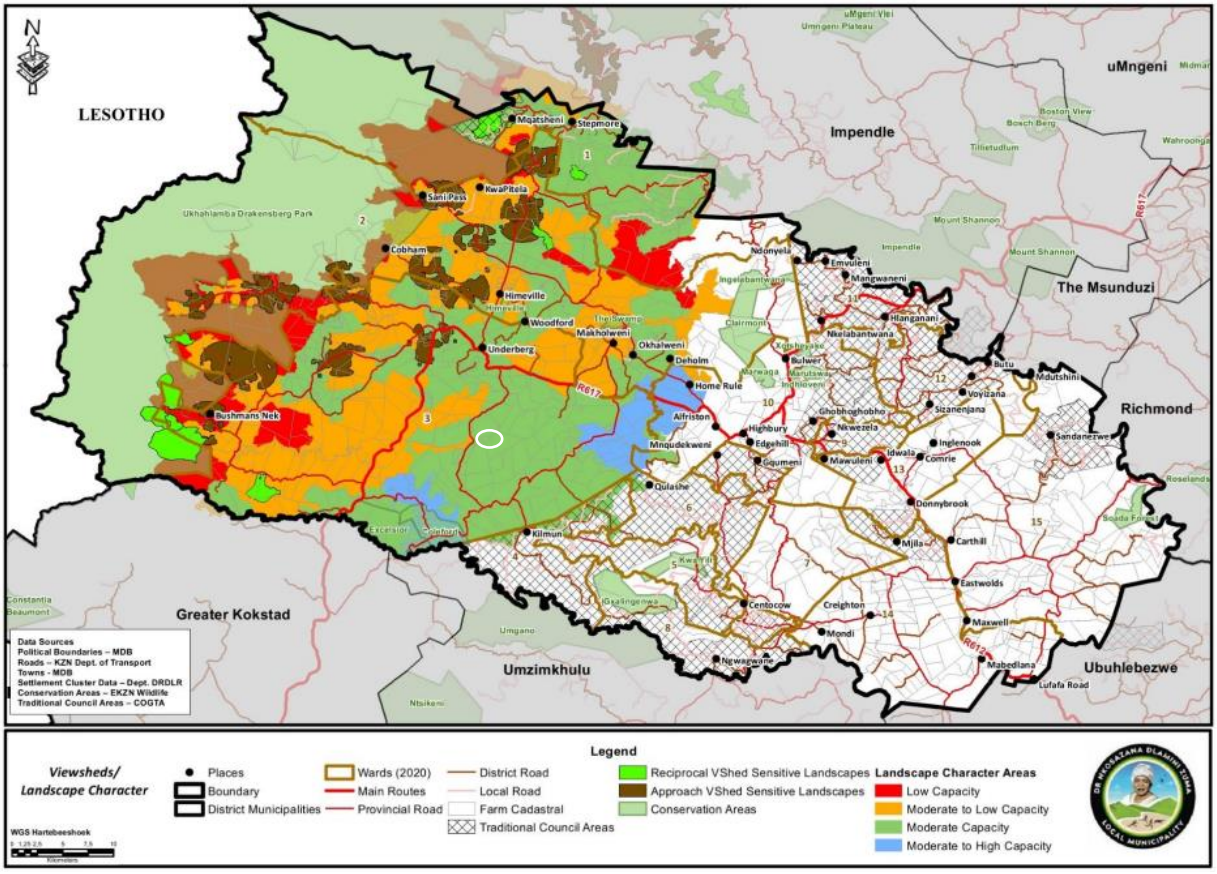


Figure 7: The incorporation of landscape character into the DNDZLM IDP.

The area earmarked for the dam development falls within a small area categorised as being of 'Moderate' development capacity, which indicates that the area can accommodate a reasonable amount of development without impacting on the aesthetic value of the viewshed of the WHS. The inclusion of this Viewshed / Landscape Character spatial product in the DNDZLM IDP indicates that the governmental vision for this area supports the protection of sensitive landscapes and their visual amenity value from inappropriate levels of development.

4.1.2 KwaZulu-Natal Drakensberg land use planning

There is a long history of land use planning policy in the Drakensberg and its approaches. Various planning bodies have drafted a number of policies aimed at protecting the Drakensberg as a water production and as a wilderness and recreational resource. These include the following:

1. The **Drakensberg policy statement** (Natal Town and Regional Planning Commission 1976) was the first planning policy to recognise the various values associated with the Drakensberg and to promote the protection of these from unsuitable development. This document proposed the establishment of four parallel development zones (Figure 8) called the wilderness heart, the landslide zone, the trail zone, and the Drakensberg threshold. The policy provided guidance regarding appropriate activities and levels of development in each zone. The dam development site falls outside of all of these zones.

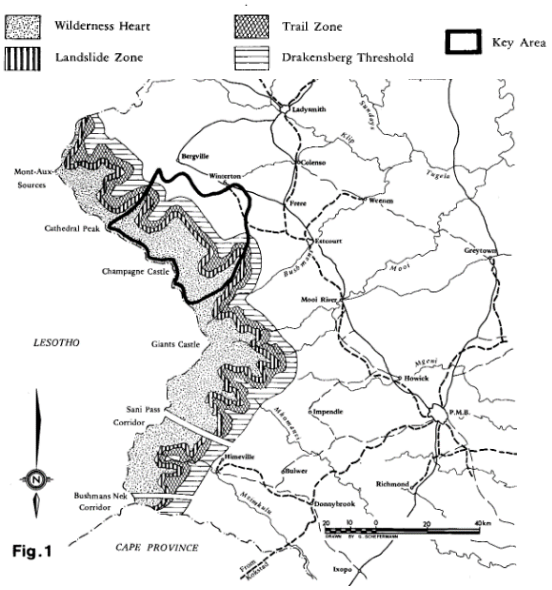


Figure 8: Land use zones defined in the Drakensberg Policy Statement

2. **The Drakensberg Approaches Policy** (DAP) (Martin, 1990) partially replaced the DPS and retained some of its key features such as the zoning plan and their associated development guidelines.

3. **Special Case Action Plan for the Southern Drakensberg** (SCAP) (Town and regional planning commission 2001) replaced the DAP as the planning policy for the Drakensberg and its approaches and introduced a revised zoning scheme (Figure 9) amongst which was the concept of a buffer associated with the protected area. The proposed dam site is located within this buffer zone.

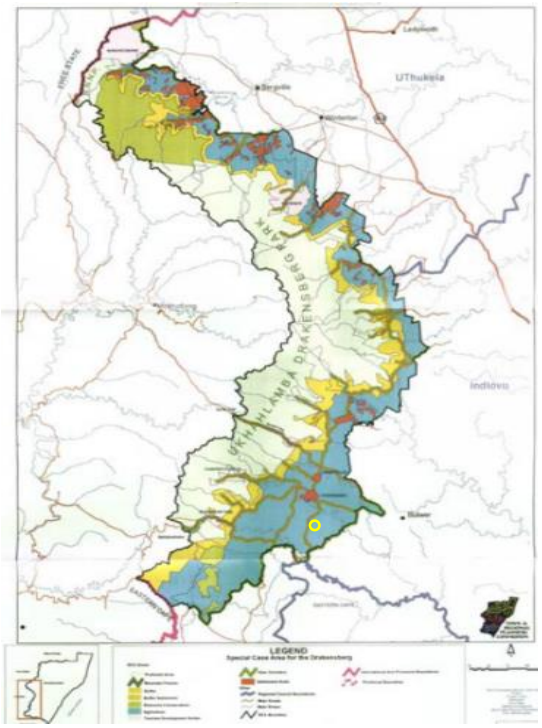


Figure 9: Land use zones included in the SCAP. Yellow circle indicates the location of the proposed dam

4.1.3 MDPWHS Buffer Zone Policy

South Africa is a signatory (signed on 10/07/1997) to the World Heritage Convention, an international treaty which created the World Heritage Sites. Signatories agree to identify, protect, conserve, and present World Heritage properties, and they recognise that the identification and safeguarding of heritage located in their territory is primarily their responsibility. A mandatory component of a property acceding to WHS status is the delineation and management of a buffer zone. "A buffer zone is an area surrounding the nominated property which has complementary legal and/or customary restrictions placed on its use and development to give an added layer of protection to the property. This should include the immediate setting of the nominated property, important views and other areas or attributes that are functionally important as a support to the property and its protection" (UNESCO 2019).

Ezemvelo KZN Wildlife, as the managing authority of the MDPWHS has drafted a buffer zone policy for this area. This policy will, once finalised, replace the SCAP and other Drakensberg planning policies. The spatial extent of the Maloti Drakensberg Park's Buffer Zone (MDPBZ) is illustrated in Figure 10. Importantly, the dam site falls outside of the MDPBZ.

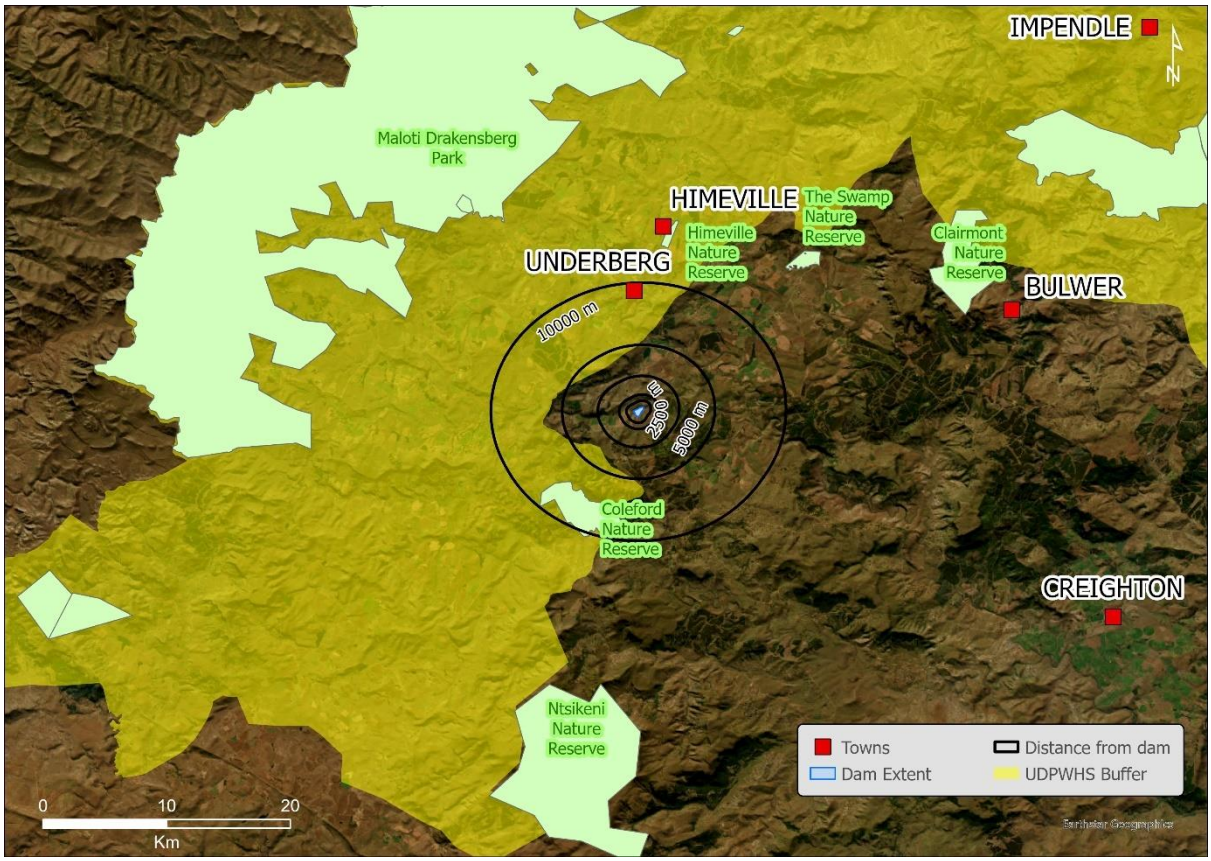


Figure 10: MDPWHS and the defined buffer zone.

4.2 Planning context summary

The planning policy, and thus vision for the area, relevant for the dam site thus indicates that whilst the broader municipal area is important for tourism and that visual impacts should be managed to protect the aesthetic value of the area, the focus and vison for the specific area is agriculture and there are no specific policies in place to restrict development outside of agricultural related activities. The construction of a farm dam thus sits well within the planning policy vision for this area.

5.0 Visual Assessment - Approach and methods

5.1 Construction of a preliminary viewshed model

In order to identify which areas are likely to be impacted by the development, a viewshed model was constructed. This was done using a digital surface model and visibility analysis tools in a Geographic Information System (GIS). Topographic data was derived from the 30m JAXA Digital Elevation Model (DEM) (Figure 3).

Non-topographic visual obstructions (NTVOs) such as trees and buildings are not included in the SRTM DEM which only reflects the terrain. If such NTVOs are located around the site of the proposed development, they can reduce the visibility of the development from viewpoints further away. Such visual obstructions must be manually added to the model to provide a realistic representation of

landscape views. In the case of this farm dam, no NTVOs of significance were identified in the immediate vicinity of the dam.

The 30m JAXA DEM was used as the terrain model in the development of a viewshed model. This was conducted in a GIS environment. A viewshed model is based on calculating lines of sight across a landscape from a specified observer point. This concept is illustrated in Figure 11. In this case, a reciprocal approach has been taken whereby a number of points representing the surface of the dam inundation are and highest points along the dam wall were captured and incorporated as observation points representing the full extent of the dam. The points were given appropriate heights based on the height of the dam level from the design drawings and these were incorporated as observer offsets. This reciprocal approach is based on the principle of intervisibility. The principle of intervisibility states that visibility is determined in two ways either from the site or to the site, that is, if point A can be seen from point B then the reverse is true. Thus, although a site's visibility is normally thought of in terms of it being viewed from outside its boundaries, the outward view from the site to adjacent areas can be adopted to simplify analysis (Aylward and Turnbull, 1977).

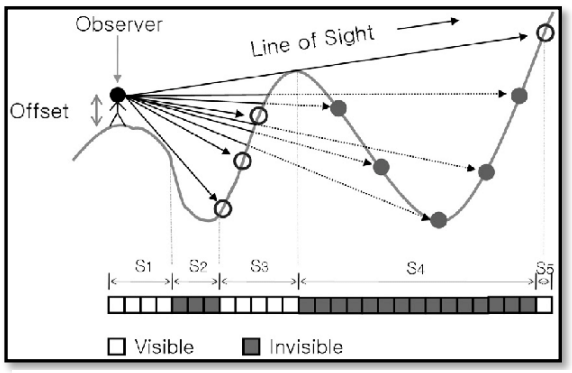


Figure 11: The concept of line of sight, the foundation of a visibility analysis.

The viewshed model derived from this procedure is shown in Figure 12.

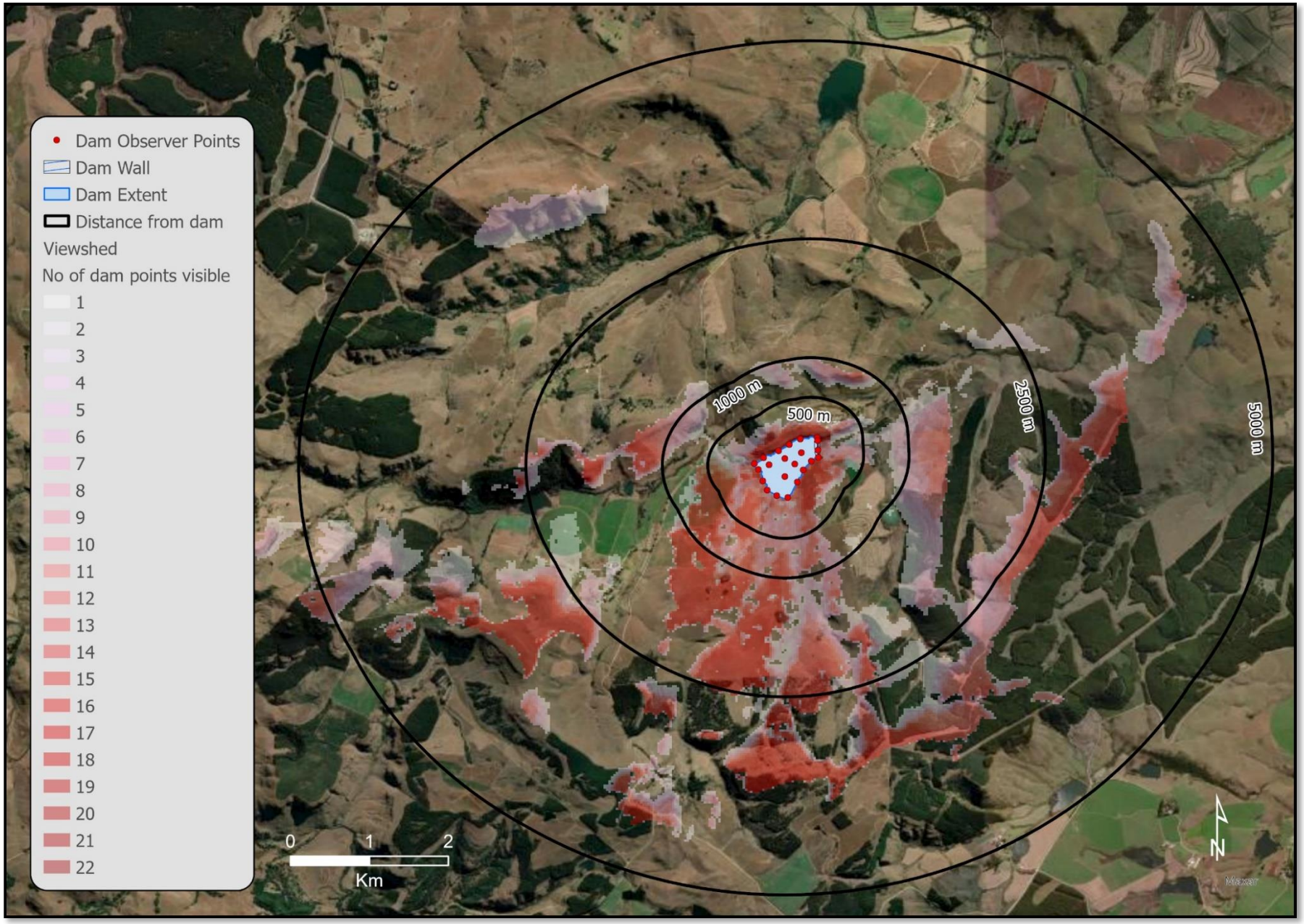


Figure 12: Viewshed model for the Fraser Farm dam development

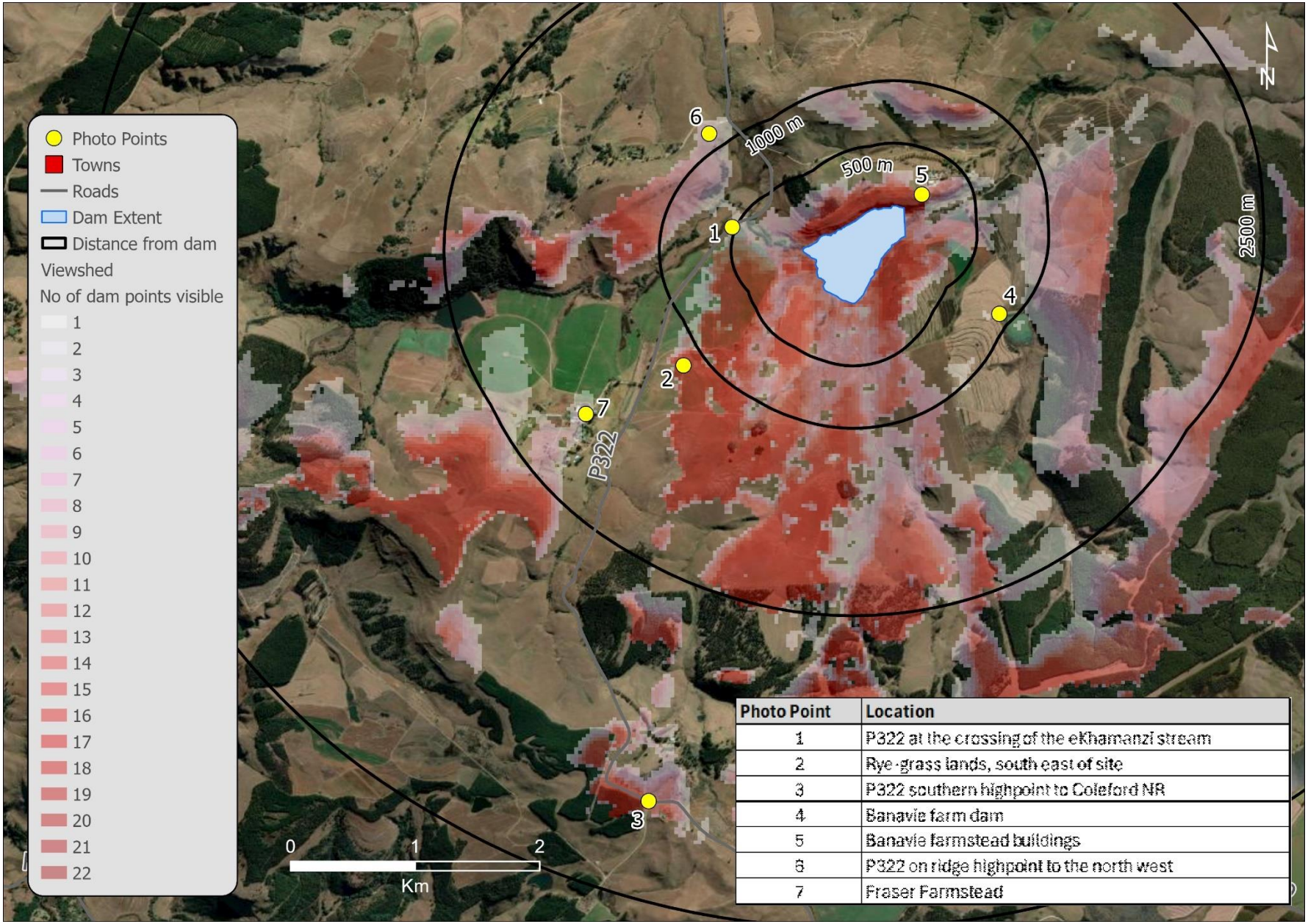


Photo Point	Location
1	P322 at the crossing of the eKhamanzi stream
2	Rye-grass lands, south east of site
3	P322 southern highpoint to Coleford NR
4	Banavie farm dam
5	Banavie farmstead buildings
6	P322 on ridge highpoint to the north west
7	Fraser Farmstead

Figure 13: Zoomed in view of the most affected areas showing photo points from key potentially sensitive viewpoints.

Information Box 1 - *Notes on the viewshed model and distance*: *The viewshed model does not take distance into account in representing feature visibility and the reducing impact of a feature viewed from increasing distance is thus not reflected in the output maps. It also does not take the volume / size of the feature into account (i.e., a single pole of 30cm diameter is treated the same as a large building in terms of line of sight, whilst in real life, the pole would become invisible relatively quickly with increasing distance. As such the map outputs which follow should be viewed with caution and interpreted as simply reflecting where an object could potentially be seen from. The actual visibility of a feature in the field and its impact on sensitive views are discussed in more detail in other sections. In order then to assess visual impact appropriately, it is therefore important to consider the mitigating effect of distance on visual impacts at a landscape level.*

Hull and Bishop (1988) identified an inverse exponential relationship between distance and visibility (Figure 14). Thus, the visual impact at 1000 metres would be approximately a quarter of the impact as viewed from 500 metres. The view of the project components would appear so small from a distance of 2500 metres or more that the visual impact at this distance is insignificant. On the other hand, the visual impact of the project components from a distance of 500 metres or less would be at its maximum. These values relate to the assessment carried out for this report and are reflected in where in some areas, although the development is theoretically visible, the impact from distances greater than 2.5 km is very low to negligible. Hull and Bishop (1988) also indicated that a tower's scenic impact is influenced by the landscape surrounding the tower. Some landscape types will contrast and make the tower stand out while others may offer camouflage. developments have less impact in more complex settings, especially at larger distances. This is because, as distance increases, the development becomes less of a focal point and the observer's attention is diverted by the complexity of the scene (Hull and Bishop, 1988).

The exception to this rule is night lighting, which can be visible from a much greater distance. Lighting is dealt with specifically later in this report.

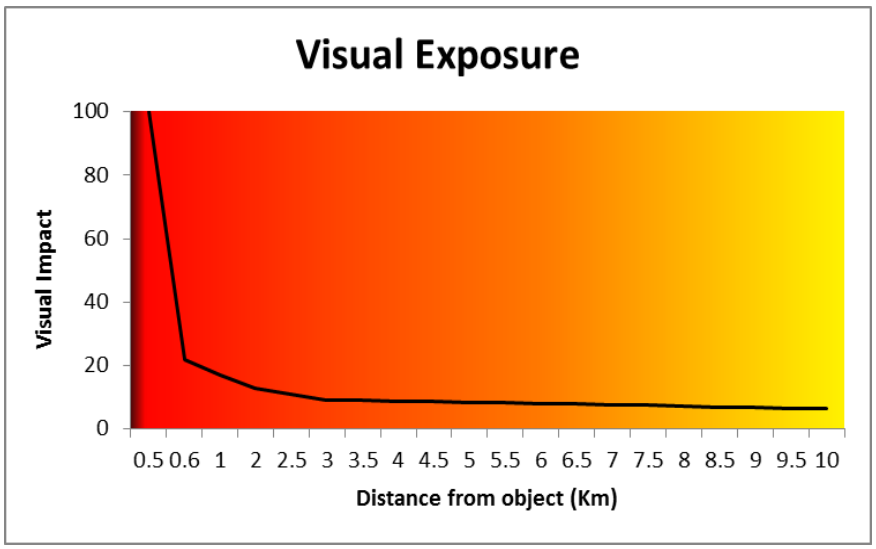


Figure 14: The relationship between distance and visual impact (after Hull and Bishop 1988)[3].

5.2 Site visit

A site visit was then conducted on Thursday the 5th of December 2024 to evaluate sensitive views and to photograph them from points where the dam development may be visible. The assessment of sensitive views was guided by the viewshed model, with the consultant visiting sites which appeared to be most impacted in the viewshed assessment.

Photographs were all taken using a Canon 70D camera fitted with a 35-55mm lens and zoomed in to the 55mm setting. This combination provides a photo output that is very similar in magnification to what the human eye would perceive.

[3] Hull and Bishop, (1988) used ordinary least square regression to determine the functional form of the relationship between distance and scenic impact. Impact decreases rapidly as distance increases. Most of the impact occurs in the 100m to 1km range. The impact at 500m is about 25% of the maximum, by 1km it is just 10%.

A map showing the locations of key photo points is given in **Error! Reference source not found.**. Corresponding photos a re contained in Addendum 3.

5.3 Landscape Characterisation and Visual Receptors

Information collected during the field trip was used to characterise the landscape in the vicinity of the proposed dam site. Landscape character is a function of a variety of tangible aspects including topography, geology, vegetation, land use, level of development and infrastructure and intangible aspects including sense of place, cultural associations and societal perceptions. Areas with any form of defined character are potentially vulnerable to visual intrusions. This is dependent upon the nature of the unit's character, the level to which the development is visible as well as the nature of the development.

Because the development is effectively a single point location development, and because of the incised nature of the eKhamanzi Valley and the consequent limited exposure of the development site, characterisation of the landscape was limited to that within the valley and along the P322. Key aspects defining the landscape character are summarised below:

1. The topography of the landscape is strongly mountainous. High grassland covered hills and doleritic outcrops and scarps in the higher and steeper parts suggesting an element of wilderness reminiscent of the Drakensberg and the proclaimed world heritage site. The land cover there is predominantly grassland, used primarily as rangeland for livestock farming.
2. The lower and flatter areas are strongly dominated by agriculture with pasture and other cultivated lands covering much of this area. Driving along the P322, one passes numerous farm dams and other farming related infrastructure. Irrigation pivots, fences, livestock, farm homesteads and other farm buildings are very evident creating a clear sense of a quiet but productive landscape.
3. The steeper slopes in the southern parts of the eKhamanzi Valley have been planted to pine and gum plantations. This creates a diversion from the predominantly pale and light green / brown palette of the grassland and cultivated areas and provides a small degree of diversity in the landscape, increasing the broader landscape's VAC slightly.

Figure 15: Landscapes typically observed as one drives along the P322, showing farm dams, irrigation infrastructure and the mountainous terrain.

5.4 Landscape enclosure

The proposed dam site is located in the upper areas of the eKhamanzi River Valley. This is a relatively deeply incised valley with dolerite scarps and relatively steep grassed slopes. It also meanders to a degree, meaning that the interlocking spurs and hills provide a high level of enclosure and topographic screening (see Figure 12). The proposed dam wall and the water body at the proposed site will effectively only be visible from very proximal locations and from a limited number of distil locations on the north facing side of the valley. All views are contained within the valley itself.

5.5 Visual Absorption Capacity

The visual absorption capacity (VAC) of a landscape is the ability of a landscape to absorb change without suffering detrimental impacts to the essence of the landscape's character. The VAC of the site's immediate vicinity is low. This is due to the grassland and cropland dominated landscape with its predominantly bi-colour green and brown hues. The texture of the landscape is also relatively simple with limited variation in land cover or use. The nature of the development however means that, despite the low generic VAC, the grassed dam wall will fit within the landscape and be largely absorbed into it, particularly if viewed from downstream. The water body will however contrast strongly with the surrounding grassland and croplands.

5.6 Identification of potentially sensitive viewpoints and receptors

Based on the viewshed model, a small number of potentially sensitive viewpoints and receptors were defined and reviewed in the field. These receptors are:

1. Road users (including landscape focused tourists and local residents) travelling along the P322, particularly on the higher lying ridges to the north west of the site and to the south (see photo points 1, 3 and 6).
2. Homesteads, residents and workers on surrounding farms (see photo points 3, 5 and 7). The only receptors in these areas are farm owners and workers of the proponents and beneficiaries of the dam. The likelihood that impacts are perceived as negative are thus very low.
3. Farmlands to the south and west of the site (see photo points 2 and 4). As with the previous point, the only receptors in these areas are farm owners and workers of the proponents and beneficiaries of the dam. The likelihood that impacts are perceived as negative are thus very low. Given that the receptors are essentially the same as those for point 2 above, this group will not be assessed further individually, but will be incorporated into the above group.

6.0 Impact assessment

The assessment of visual impact included assessment of impacts associated with design, construction, operation and decommissioning phases.

Potential impacts are assessed using the following scoring system:

Likelihood of impact occurring

Score	Interpretation
0	Impossible
1	Highly unlikely
2	Likely
3	Highly Likely
4	Certainty

Duration of impact should it occur

Score	Interpretation
0	Never
1	Construction only
2	Construction and decommissioning only
3	Operational phase
4	Entire life cycle including Decommissioning

Impact severity

Score	Interpretation
0	No Impact
1	Very low impact
2	Low impact
3	Moderate impact
4	High impact
5	Very high impact

All potential impacts are initially assessed on the basis of a worst-case scenario where no mitigation is put in place and no recognition is given to the importance of limiting visual impact. They are then also assessed with a suite of mitigation measures implemented. Two key impacts have been distilled from the assessment. These are assessed below:

Potential impact	Likelihood	Duration	Severity without mitigation	Impact-specific mitigation	Severity with mitigation
Proximal farm homesteads' views of a 'natural' eKhamanzi valley may be compromised.	1	4	1	All earthwork areas including the dam wall and the spillway are to be completely re-vegetated using appropriate grasses, preferably locally indigenous species. No bare earth areas are to be left unvegetated. All pump houses and other brick infrastructure should be painted in earthy tones of browns and greens or earthy tone bricks should be used. No reflective surfaces should be left unpainted also using earthy tones. Any lights placed on the dam/pump infrastructure must be fully shielded and focused downward to ensure they are not visible from the P322 and do not create any artificial skyglow/lighting of the surrounding landscape.	0
Drakensberg tourism (particularly visitors to Coleford) may be impacted by a loss of a wilderness sense of place and natural vistas in the area as a result of construction activities.	2	1	2	Re-vegetation of earthworks areas must be undertaken as soon as possible on all earth works, especially exposed cut surfaces. All stockpiles of earth materials should be covered in green / brown coloured shade cloth. If construction work is carried out at night, the use of flashing lights on vehicles should be kept to a minimum.	1

Drakensberg tourism (particularly visitors to Coleford) may be impacted by a loss of natural vistas in the area.	1	4	1	All earthwork areas including the dam wall and the spillway are to be completely re-vegetated using appropriate grasses, preferably locally indigenous species. No bare earth areas are to be left unvegetated. All pump houses and other brick infrastructure should be painted in earthy tones of browns and greens or earthy tone bricks should be used. No reflective surfaces should be left unpainted also using earthy tones. Any lights placed on the dam/pump infrastructure must be fully shielded and focused downward to ensure they are not visible from the P322 and do not create any artificial skyglow/lighting of the surrounding landscape.	0

3.2 Mitigation for all impacts.

The mitigation measures recommended for implementation in the impact table above are summarised here:

- As little vegetation as possible should be removed from site, particularly below and to the sides of the dam wall.
- All cleared areas not contained within the inundation area must be revegetated as soon as possible.
- When not in use, all materials stock piles should be covered using shade cloth or other earthy coloured material
- Construction vehicles should refrain from reversing as far as possible in order to minimise the sounds of reverse warning which can reduce the peaceful sense of place in this farming landscape.
- If construction work is carried out at night, the use of flashing lights on vehicles should be kept to a minimum.
- Any lights placed on the dam/pump infrastructure must be fully shielded and focused downward to ensure they are not visible from the P322 and do not create any artificial skyglow/lighting of the surrounding landscape.

7.0 Conclusion and recommendations

The proposed development is not in conflict with the existing landscape and the vision for the area expressed in the municipal IDP. Farm dams are an often-encountered element in this farming landscape and the construction of a dam at the proposed site will not conflict with existing farming sense of place.

The P322 is a relatively quiet road but with active farming operations and a number of residential homesteads. It also has the potential to carry landscape focused tourists. The landscape colours and textures are relatively simple with significant levels of enclosure around the dam site. The exceptions to this are the homesteads and farm buildings immediately to the north-east and further away to the south of the development where the visibility of the dam is relatively high. Farm dams are however a common feature of this agriculturally themed landscape and water bodies are generally considered positive aesthetic features inspiring a sense of tranquillity and natural beauty. These factors mean that any negative impact of a farm dam will be highly limited in its nature and scope and for most the dam will be a positive addition to the aesthetics of the landscape.

The locally based people who are likely to be most significantly impacted are both the proponents of the dam and beneficiaries of the water supplied by the dam and are thus unlikely to see these impacts in a negative light.

Implementing recommended mitigation measures will reduce any potential negative impacts (mostly associated with construction) to a minimum.

7.1 Impact Statement

The development of a farm dam as described in the information provided to this consultant will have a zero to very low negative impact on the visual amenity value of the eKhamanzi Valley near Underberg. The development is more likely to have a net positive local impact in terms of local scenic value. The proposed dam will not negatively affect views of the area from the World Heritage Site or for tourists visiting Coleford Nature Reserve.

8.0 References

Aylward, G. and Turnbull, M. (1977) Visual analysis: a computer-aided approach to determine visibility. Computer-Aided Design, 9, 103-108.

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Oberholzer, B (2005). Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 R. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

Swanwick, C. 2002. Landscape Character Assessment, guidance for England and Scotland. Prepared on behalf of The Countryside Agency and Scottish Natural Heritage.

The Landscape Institute, 2002. *Guidelines for Landscape and Visual Impact Assessment* 2nd ed. United Kingdom: Spon Press

United States Department of the Interior. 2013. Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands. Bureau of Land Management. Cheyenne, Wyoming. 342 pp, April.

9.0 Addendum 1 – CV of VIA specialist

CURRICULUM VITAE - LEO MALCOLM QUAYLE (*PrSciNat*)

PERSONAL DETAILS

Date of Birth:	22 January 1977
Identity Number:	7701225076088
Nationality:	Dual South African/British
Languages:	English, Afrikaans
Education	Matric – B aggregate (Michaelhouse, KZN - 1994)
	BSc – Chemistry, Geography, (UN, PMB – 1997)
	BSc (hons) - GIS, Geomorphology, (UN, PMB – 1999)
	MPhil – Environmental Management, (UCT – 2001)
	Introduction to VB programming (UNISA – 2012)

KEY RELEVANT EXPERIENCE

Leo is a registered Professional Natural Scientist and a specialist in GIS and environmental spatial planning. He has a Master's degree in environmental management and 20 years' experience working in various environmental and planning fields. This includes working permanently for various periods in the United Kingdom, Ghana, and South Africa. He has worked as a project leader, GIS specialist and spatial environmental planner in a number of local and international environmental management roles and projects and has led the development of a number of GIS tools for various environmental planning projects including Environmental Management Frameworks (EMF) and Environmental Constraint Frameworks (for Eskom distribution master planning). He has worked in a number of roles involving visual impact assessment and the assessment of landscape character. The most relevant of these are:

1. As the GIS officer for the City of London Corporation, he was responsible for a variety of GIS related functions, including maintaining the view corridors associated with St Paul's Cathedral, and assessing city development proposals for impacts on these views.
2. He has assessed and described the character of landscapes in seven local municipalities adjacent to the uKhahlamba World Heritage Site and developed development capacity zones for these areas based on visual impact, sense of place, cultural value etc. These zones have been included in the development of the WHS buffer zone, which aims to (amongst other things) preserve the character of the landscapes associated with the WHS, including views of the surrounding landscape from within the WHS.
3. He has also undertaken a visual impact assessment as part of the Watson North Functional Area Plan in eThekwini Metro.
4. He has undertaken the visual impact assessment of the Hilton Dairy residential development in Hilton.
5. He has undertaken the visual impact assessment of a 132KW powerline associated with a proposed automotive supplier park development at Illovo on the KZN South Coast

6. He has undertaken the visual impact assessment for Eskom of a proposed solar farm and associated infrastructure outside Upington in the Northern Cape
7. He has undertaken a Visual Impact Assessment on a proposed wedding venue development in the Champagne Valley, northern Drakensberg, KZN.
8. He has undertaken a visibility assessment for the proposed Annandale housing estate adjacent to Michaelhouse in the KZN midlands.
9. He has undertaken a Visual Impact Assessment for a proposed mixed-use development adjacent to Sani Pass hotel in the Southern Drakensberg of KZN.
10. He has undertaken a Visual Impact Assessment for Eskom on a powerline upgrade project around Harrismith in the eastern Free State.

RECORD OF EMPLOYMENT

Time frame	Employer	Position(s) held and responsibilities
2021 - Present	GeoNest (Pty) Ltd.	Director of GeoNest and Principal Scientist
2015 - 2020	Institute of Natural Resources	**Principal Environmental Scientist**: Responsible for leading the Environmental Monitoring and Environmental Information Systems work area at the INR, covering spatial analysis, terrestrial and aquatic monitoring, remote sensing and mapping.
2011 – 2014	Institute of Natural Resources	**Senior Environmental Scientist:** GIS leader and project leader / co-ordinator for water and biodiversity related studies. Contributing researcher in Integrated Environmental Management Theme
2008 - 2010	Institute of Natural Resources	**Environmental Scientist:** Primary researcher on water related studies on aquatic biota and water quality. INR leader in GIS and spatial analysis.
2003 - 2008	Various UK Based organisations including City of London Corporation (UK)	**GIS Specialist:** Providing GIS support to various borough functions, primarily town planning and maintaining borough GIS data.

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

- Geo-Information Society of South Africa (GISSA)
- South African Council for Natural Scientific Professions (*PrSciNat* - water resources science, ecological science

10.0 Addendum 2 – Catalogue of photographs from Photo Points

Photo Point	Location
1	P322 just above the crossing of the eKhamanzi stream
2	Rye-grass lands, south west of site
3	P322 southern highpoint to Coleford NR
4	Banavie farm dam
5	Banavie farmstead buildings
6	P322 on ridge highpoint to the north west
7	Fraser Farmstead buildings

10.1 Photo Point 1

Plate 2: View towards the dam site from Photo Point 1. Note the visual interference caused by the Banavie ridge sloping down from left to right behind ~~which~~ where the dam site is located.

10.2 Photo Point 2

Plate 3: View over the dam site (rough approximation in yellow) from the ryegrass fields at Photo Point 2. The dam wall and the water body will be fully visible from this point, though this is not publicly accessible.

10.3 Photo Point 3

Plate 4: View towards the dam site from the P322 on the high lying southern ridge. Dam site visible ~~and~~ marked in yellow.

10.4 Photo Point 4

Plate 5: View towards the dam site from Photo Point 4. Dam site is obscured by topography

10.5 Photo Point 5

Plate 6L View over the dam site from Photo Point 5. Inundation area visible, but dam wall is at the base of the slope in the foreground and is obscured by topography.

10.6 Photo Point 6

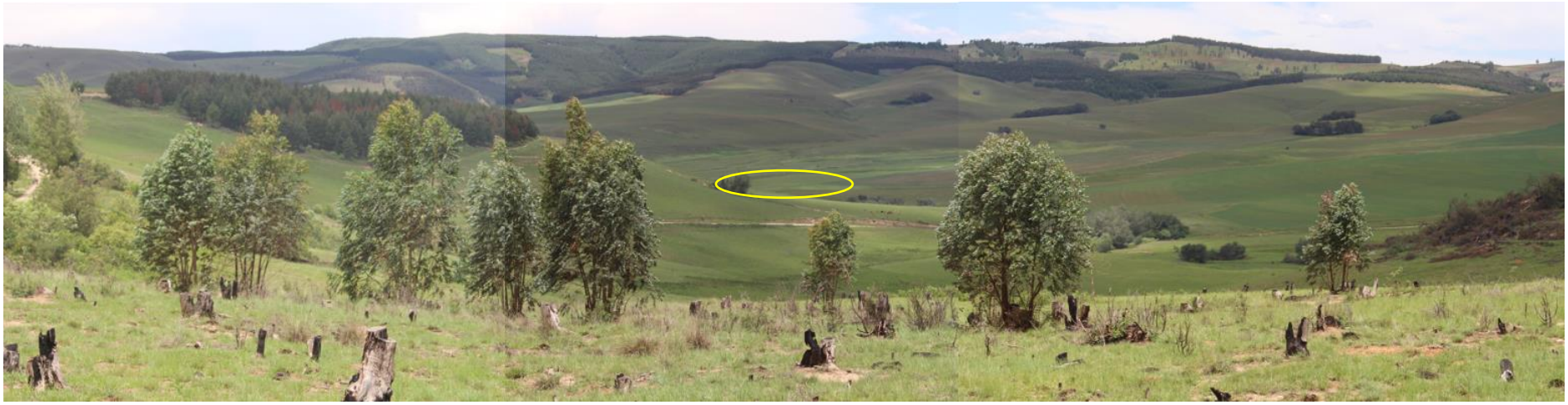

Plate 7: View towards dam site from Photo Point 6. Inundation area potentially partially visible (marked in yellow).

10.7 Photo Point 7

Plate 8: View towards the west of the dam site. View directly towards the dam is obscured by large trees (right of picture).